Trend Study 16C-1-02

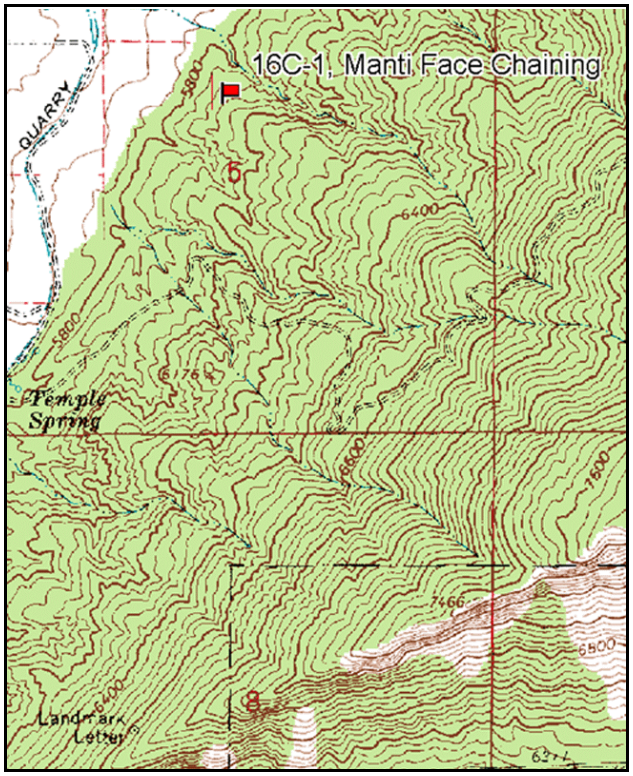
Study site name: Manti Face Chaining . Vegetation type: Chained, Seeded P-J .

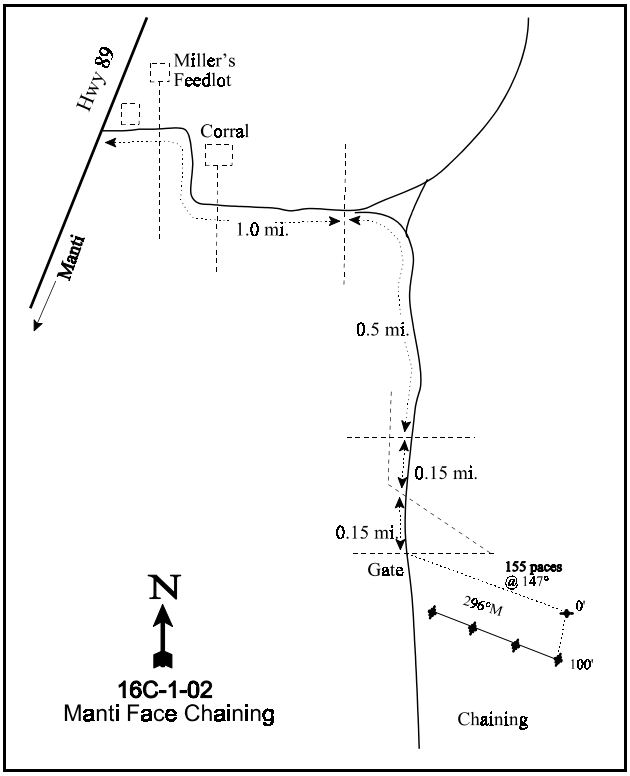
Compass bearing: frequency baseline 192 degrees magnetic (line 2-4 @ 296°M).

Frequency belt placement: line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft). Rebar: belt 3 on 1ft., belt 2 on 3 ft.

LOCATION DESCRIPTION

Go north out of Manti on Highway 89 about 1 mile or so to a feedlot on the right (east) side of the road. Turn right on south side of these corrals. Go up this county road 1 mile, following the main road around the upper corrals, to an old fence line. Just past the fence, bear right off the main road onto a faint road. Follow this road 0.5 miles to the first DWR fence. Go through this small section of DWR land 0.15 miles to another fence. Go 0.15 miles to another DWR fence. Stop at this gate. From here, the study site is up the hill in the chaining. Walk 155 paces at 139 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9043.





Map Name: Ephraim

Diagrammatic Sketch

Township 18S , Range 3E , Section 5

GPS: NAD 27, UTM 12S 4347798 N 447717 E

DISCUSSION

Manti Face Chaining - Trend Study No. 16C-1

The Manti Face Chaining study is located on Division property northeast of Manti. The study is on a moderately steep (28%), west facing slope at an elevation of 5,800 feet. This site was placed on one of the many chainings along the Ephraim/Manti front that are adjacent to cultivated fields. Because the project was done when chainings where treated as large rectangular areas, protective cover is lacking on the treated area and there is limited sign of deer and elk use. Pellet group transect data taken in 2002 estimated 63 deer days use/acre (155 ddu/ha), less than 1 elk day use/acre (2 edu/ha), and 2 cow days use/acre (5 cdu/ha). A few sheep pellet groups were also sampled in the transect. Since this property is not normally grazed by livestock, the cow and sheep pellets are apparently from trespass animals.

Soils on the site are clay loam in texture and neutral to slightly alkaline in reactivity (pH = 7.3). Soils are reported to be somewhat excessively drained. Effective rooting depth is moderately low at less than 10 inches. Rock and pavement are abundant on the surface and throughout the profile. Rock and pavement combined to cover nearly 34% of the soil surface in 1997 and 2002. Bare soil was low at 15% in 2002. Litter cover is low, but well distributed over the site. The ratio of protective ground cover to bare soil is good at 3:1. Soils have a high erosion hazard due to rapid runoff, a major factor why this site was chained. Considering this, soil condition has improved since the treatment. An erosion condition class assessment done in 2002 indicated that it was in stable condition.

There is limited browse forage available on the chaining, and seeded species are relatively uncommon. A few large and robust four-wing saltbush occur on the site, along with an occasional small bitterbrush found within the planting rows left by seed dribblers. Both species have good vigor and show moderate utilization. The small native black sagebrush have a slightly increasing population due to a high proportion of young plants in the population in 1997 (48%) and 2002 (62%). Density of black sagebrush was estimated at 500 plants/acre in 1997 and 680 plants/acre in 2002. Utilization on black sagebrush is mostly light and vigor is normal in the majority of the population. Annual growth averaged about 1.4 inches on black sagebrush in 2002.

During the initial sampling in 1989, surviving juniper appeared to be rapidly increasing in size in the treated area. Point-center quarter density data from 2002 estimated 118 juniper trees/acre and 21 pinyon trees/acre. The population of broom snakeweed was abundant in 1989, but has steadily declined with continuing drought on the site since to an estimated 540 plants/acre in 2002.

As with most chainings, grasses are the dominate component in the community. Both seeded and native species are abundant including several species of wheatgrass (crested, intermediate, and bluebunch) and Sandberg bluegrass. These four species provided 79% of the total grass cover in 1997, increasing to 96% in 2002. All four of these species remained at stable frequencies between 1997 and 2002. Less abundant species include Indian ricegrass, sheep fescue, and bottlebrush squirreltail. Due to drought conditions in 2002, grass identification was difficult due to minimal production and seedhead development. Most of the understory biomass was dried up when the site was read in July 2002. Forbs are limited on this site with annual species being more abundant than perennials. With the drought in 2002, both annual and perennial species declined in sum of nested frequency. Seeded species such as alfalfa and small burnet were not sampled in 2002. Bur buttercup, a weed that has allelopathic characteristics, was the single most abundant species in 1997 and 2002.

1989 APPARENT TREND ASSESSMENT

For deer winter range, browse is lacking. The productive herbaceous vegetation provides attractive green-up in the spring and good forage for elk. It is clearly an improvement from pre-treatment conditions, and should continue to be productive in terms of grass. To meet management objectives, the browse component needs to improve. Soils appear to be improving due to increasing vegetation cover and the build-up of some litter.

1997 TREND ASSESSMENT

Even though percent bare soil has increased to 13%, it is still relatively low for a chained pinyon-juniper site. Ninety percent of the total vegetative cover is contributed by herbaceous species. Trend for soil is considered stable. The browse component is still quite low as it makes up less than 10% of the total vegetative cover on the site. Juniper provides the majority of the woody cover that is present with preferred species being almost nonexistent. Browse trend is stable, but contributes little browse for wintering big game. The herbaceous understory is stable. Sum of nested frequency values are stable for perennial grasses and forbs, although the abundance of bur buttercup has drastically increased since 1989 as well.

TREND ASSESSMENT
soil - stable (3)
browse - stable, but preferred species are limited (3)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soils is stable. Ground cover characteristics remain stable and erosion is minimal. Browse remains limited on this site, but trend is stable. Black sagebrush slightly increased in density and has a high recruitment rate. Four-wing saltbush and bitterbrush have low densities, good vigor, and moderate use. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses slightly declined overall, but the four most abundant species all remained stable. Perennial forbs are insignificant, and bur buttercup significantly decreased in nested frequency. Although trend is stable for the herbaceous component, this site looked very poor when it was read in 2002. Drought limited production and seedhead development.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron cristatum	a125	b182	b216	51	71	73	5.77	10.67
G	Agropyron intermedium	118	128	101	44	51	35	4.05	3.20
G	Agropyron spicatum	47	43	64	19	15	24	1.23	5.36
G	Bromus inermis	1	-	-	1	-	-	-	-
G	Bromus japonicus (a)	-	5	-	-	2	-	.15	-
G	Bromus tectorum (a)	-	b81	a14	-	30	6	.71	.05
G	Elymus junceus	a18	b26	a-	10	10	-	1.39	-
G	Festuca ovina	21	14	16	10	6	7	.25	.91
G	Oryzopsis hymenoides	1	6	-	1	2	-	.41	-
G	Poa secunda	129	158	137	50	59	53	1.60	1.41
G	Sitanion hystrix	b130	a28	a7	63	13	4	.39	.07
Total for Annual Grasses		0	86	14	0	32	6	0.87	0.05
Total for Perennial Grasses		590	585	541	249	227	196	15.11	21.64
Total for Grasses		590	671	555	249	259	202	15.98	21.69

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
F	Alyssum alyssoides (a)	-	1	-	-	1	-	.00	-
F	Arabis spp.	1	-	-	1	-	-	-	-
F	Arenaria fendleri	-	3	-	-	1	-	.00	-
F	Astragalus spp.	3	-	-	1	-	-	-	-
F	Camelina microcarpa (a)	-	$_{b}$31	$_{a}$-	-	13	-	.09	-
F	Chaenactis douglasii	-	6	-	-	2	-	.01	-
F	Chenopodium fremontii (a)	-	1	-	-	1	-	.00	-
F	Chorispora tenella (a)	-	3	-	-	1	-	.03	-
F	Convolvulus arvensis	$_{a}$-	$_{b}$13	$_{ab}$11	-	6	4	.40	.07
F	Collinsia parviflora (a)	-	-	1	-	-	1	-	.00
F	Cryptantha spp.	$_{b}$14	$_{b}$21	$_{a}$-	9	11	-	.22	-
F	Descurainia pinnata (a)	-	$_{b}$14	$_{a}$-	-	7	-	.03	-
F	Draba spp. (a)	-	3	-	-	1	-	.00	-
F	Erodium cicutarium (a)	-	1	-	-	1	-	.00	-
F	Galium aparine (a)	-	1	-	-	1	-	.00	-
F	Lappula occidentalis (a)	-	3	-	-	1	-	.00	-
F	Lactuca serriola	3	3	-	1	1	-	.00	-
F	Medicago sativa	$_{b}$23	$_{b}$12	$_{a}$-	11	6	-	.29	-
F	Penstemon pachyphyllus	3	-	-	1	-	-	-	-
F	Phlox hoodii	7	8	1	4	3	1	.04	.03
F	Phlox longifolia	-	-	1	-	-	1	-	.00
F	Ranunculus testiculatus (a)	-	$_{b}$297	$_{a}$131	-	91	49	3.84	.46
F	Sanguisorba minor	8	-	-	4	-	-	-	-
F	Sisymbrium spp. (a)	7	-	-	3	-	-	-	-
F	Streptanthus cordatus	3	1	-	1	1	-	.00	-
F	Taraxacum officinale	-	-	3	-	-	1	-	.00
F	Tragopogon dubius	$_{b}$19	$_{ab}$14	$_{a}$1	9	8	1	.07	.00
Total for Annual Forbs		7	355	132	3	118	50	4.02	0.47
Total for Perennial Forbs		84	81	17	42	39	8	1.05	0.11
Total for Forbs		91	436	149	45	157	58	5.08	0.58

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 16C, Study no: 1

Type	Species	Strip Frequency '97	Strip Frequency '02	Average Cover % '97	Average Cover % '02
B	Artemisia nova	12	7	.03	.15
B	Atriplex canescens	2	2	-	-
B	Ephedra viridis	2	1	.03	.00
B	Gutierrezia sarothrae	2	7	.09	.33
B	Juniperus osteosperma	11	11	2.03	2.55
B	Purshia tridentata	2	3	.03	.00
Total for Browse		31	31	2.22	3.05

CANOPY COVER -- LINE INTERCEPT
Herd unit 16C, Study no: 1

Species	Percent Cover '97	Percent Cover '02
Artemisia nova	-	.42
Gutierrezia sarothrae	-	.08
Juniperus osteosperma	-	1.33

Key Browse Annual Leader Growth
Herd unit 16C , Study no: 1

Species	Average leader growth (in) '02
Artemisia nova	1.4

Point-Quarter Tree Data
Herd unit 16C , Study no: 1

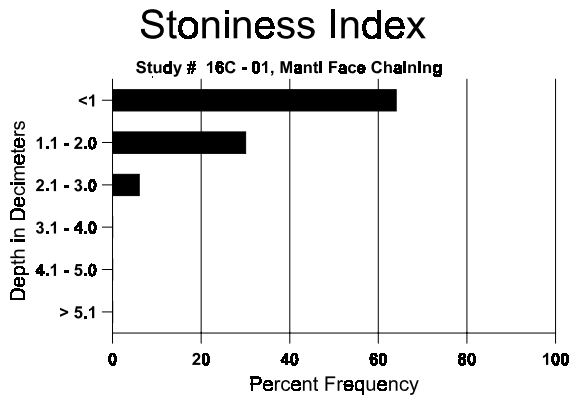
Species	Trees per Acre '97	Trees per Acre '02	Average diameter (in) '97	Average diameter (in) '02
Juniperus osteosperma	183	118	1.5	1.8
Pinus edulis	6	21	2.1	1.3

BASIC COVER --
Herd unit 16C, Study no: 1

Cover Type	Nested Frequency '97	Nested Frequency '02	Average Cover % '89	Average Cover % '97	Average Cover % '02
Vegetation	357	323	13.50	28.21	25.92
Rock	258	261	7.00	7.33	8.05
Pavement	330	328	47.00	26.63	25.63
Litter	381	368	25.25	31.50	34.34
Cryptogams	67	122	.25	.55	3.27
Bare Ground	263	261	7.00	13.08	15.64

SOIL ANALYSIS DATA --
Herd Unit 16C, Study no: 01, Manti Face Chaining

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
9.6	59.8 (12.4)	7.3	38.0	34.4	26.6	3.3	9.2	150.4	.5



PELLET GROUP FREQUENCY --
Herd unit 16C, Study no: 1

Type	Quadrat Frequency '97	Quadrat Frequency '02	Pellet Transect Pellet Groups per Acre 02	Pellet Transect Days Use per Acre (ha) 02
Sheep	-	-	17	1 (3)
Rabbit	17	27	-	-
Elk	23	5	9	1 (2)
Deer	36	54	82	63 (155)
Cattle	1	-	26	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	89	-	1	1	-	-	-	-	-	-	2	-	-	-	66			2
	97	11	1	-	-	-	-	-	-	-	12	-	-	-	240			12
	02	21	-	-	-	-	-	-	-	-	21	-	-	-	420			21
M	89	14	3	-	-	-	-	1	-	-	17	1	-	-	600	7	13	18
	97	8	5	-	-	-	-	-	-	-	13	-	-	-	260	12	20	13
	02	-	7	4	-	-	-	-	-	-	11	-	-	-	220	11	20	11
D	89	4	-	1	-	-	-	-	-	-	2	-	2	1	166			5
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	1	-	-	-	-	-	-	-	1	-	-	1	40			2
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	16%	08%	12%	-40%
'97	24%	00%	00%	+26%
'02	24%	12%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	832	Dec:		20%
'97	500			0%
'02	680			6%

Atriplex canescens																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	1	-	-	-	-	-	-	2	-	-	-	40	38	61	2
	02	1	1	-	-	-	-	-	-	-	2	-	-	-	40	46	62	2
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	50%	50%	00%	+ 0%
'02	50%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	0	Dec:	-
'97	40		-
'02	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	42	36	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	0		-

Ephedra viridis																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	1	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	12	0
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	50%	00%	-50%
'02	00%	00%	100%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	0%
	'97	40		0%
	'02	20		100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	97	22	-	-	-	-	-	-	-	-	22	-	-	-	440			22
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	40	-	-	-	-	-	-	-	-	40	-	-	-	1333	7	10	40
	97	13	-	-	-	-	-	-	-	-	13	-	-	-	260	9	9	13
	02	21	-	-	-	-	-	-	-	-	21	-	-	-	420	6	7	21
D	89	8	-	-	-	-	-	-	-	-	5	-	-	3	266			8
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	06%	-60%
'97	00%	00%	00%	-23%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	1765	Dec:	15%
	'97	700		0%
	'02	540		22%

Juniperus osteosperma																		
S	89	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	97	2	-	-	-	-	-	-	-	-	1	1	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	8	-	-	1	-	-	-	-	-	9	-	-	-	300			9
	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	89	4	-	-	-	-	-	-	-	-	4	-	-	-	133	54	44	4
	97	2	1	-	2	-	-	-	-	-	5	-	-	-	100	15	35	5
	02	7	1	-	-	-	-	-	1	-	9	-	-	-	180	-	-	9
D	89	1	-	-	-	-	-	-	-	-	-	-	1	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	07%	-48%
'97	08%	00%	00%	+ 0%
'02	08%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	466	Dec:	7%
	'97	240		0%
	'02	240		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	66	Dec:	-
	'97	0		-
	'02	0		-

Purshia tridentata																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	1	-	-	-	-	-	-	2	-	-	-	40	6	14	2
	02	-	-	1	-	-	1	-	-	-	2	-	-	-	40	6	20	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	50%	50%	00%	+33%
'02	00%	67%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	40		-
	'02	60		-